

CSE440: Introduction to HCI

Methods for Design, Prototyping and Evaluating User Interaction

Lecture 14:
Patterns

Nigini Oliveira
Abhinav Yadav
Liang He
Angel Vuong
Jeremy Viny

May 13

3a - Paper Prototype

May 14

Accessibility

[slides]

10:00 - 11:20 | OUG 136

May 15

Nigini's office hours

10:00 - 12:00

Allen Center 338

May 16

Patterns

10:00 - 11:20 | OUG 136

3b - Heuristic Evaluation

May 17

Section

10:30 - 11:20 | MGH 058

11:30 - 12:20 | MGH 058

1:30 - 2:20 | MGH 058

2:30 - 3:20 | MGH 058

Reading 3: Usability Testing

3c - Usability Testing Check-In (for Saturday)

May 20

May 21

Interface Implementation

10:00 - 11:20 | OUG 136

May 22

3d - Usability Testing Review

Nigini's office hours

10:00 - 12:00

Allen Center 338

May 23

Recap and Exam Q&A Session

10:00 - 11:20 | OUG 136

May 24

Section

10:30 - 11:20 | MGH 058

11:30 - 12:20 | MGH 058

1:30 - 2:20 | MGH 058

2:30 - 3:20 | MGH 058

May 27

3e - Digital Mockup

May 28

3f - Workshop

10:00 - 11:20 | OUG 136

May 29

Nigini's office hours

10:00 - 12:00

Allen Center 338

May 30

Exam

10:00 - 11:20 | OUG 136

May 31

Section

10:30 - 11:20 | MGH 058

11:30 - 12:20 | MGH 058

1:30 - 2:20 | MGH 058

2:30 - 3:20 | MGH 058

3f - Getting the Design Right

Patterns

“... a general repeatable solution to a commonly-occurring usability problem in interface design...”

Patterns

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Street address	<input type="text"/>
City	<input type="text"/>
	<small>If U.S. Military, enter APO/FPO for City.</small>
State	<input type="text" value="Select State"/>
	<small>If U.S. Military, select AE, AP or AA from bottom of list for State.</small>
ZIP code	<input type="text"/> <input type="text"/>
Country	USA

[Save Changes](#)

Where am I in the process?

half.com
by **ebay**

Checkout

1 Shipping → 2 Billing → 3 Place Order

Secure Shopping

Step 1 - Choose Shipping Address

Ship my order to:

Jason Hong
387 Soda Hall Computer Science UC Berkeley
Berkeley, CA 94720 [Use This Address](#)

OR

Enter a new shipping address:

Name

Street address

City

If U.S. Military, enter APO/FPO for City.

State

If U.S. Military, select AE, AP or AA from bottom of list for State.

ZIP code

Country USA

[Save Changes](#)

Noticed anything different?

half.com™ by ebay

NEW: Counting Crows: *Hard Candy* \$11.88 Save 37%! my account cart help [home](#) [sign out](#)

Home Books Music DVDs/Movies Video Games Computers & Software Electronics Everything Else...

Bestsellers Greatest Hits Live CDs Box Sets CDs \$2.99 or less

Search: Music [Advanced Search](#)

Home > Music [Sell yours now!](#)

Weezer (2001)
Weezer

Our best price: **\$6.99**
List Price: \$18.97 (Save: \$11.98)

Compare our Prices!
Half.com **\$6.99**

Find out more...
[Full product info](#), [Product Reviews](#)

Like New Sorted by Price

Price	Total Price	Seller (Rating)
\$7.75 Buy!	\$10.20 Media Mail	custodian46 (142) ★
\$8.00 Buy!	\$10.45 Media Mail	stargaze13 (3)
\$8.25 Buy!	\$10.70 Media Mail	dazzyliz (1205) ★
\$8.30 Buy!	\$10.75 Media Mail	naojia@hotmail.co (35)

Very Good Sorted by Price

Price	Total Price	Seller (Rating)
\$8.00 Buy!	\$10.45 Media Mail	lucidsky (14) ★
\$8.84 Buy!	\$11.29 Media Mail	steveeq1 (82) ★
\$9.00 Buy!	\$11.45 Media Mail	saint.timothy (18) ★

Product Highlights

CD
May 2001
List Price: \$18.97
28 minutes
UPC 606949-30452-2
Geffen Records
Catalog 493 045

Standard shipping (USPS Media Mail) for this item is \$2.30.

About this album:
» [Song List](#)
» [Album Credits](#)
» [Album Notes](#)
» [Editorial](#)
» [Customer Reviews](#)

About the Artist
» [Other Works](#)

Spread the Word:
» [Write a Review](#)
» [Favorite Friend](#)

half.com™ by ebay

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1 Shipping → 2 Billing → 3 Place Order Secure Shopping

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If U.S. Military, select AE, AP or AA from bottom of list for State.

ZIP code

Country USA

[Save Changes](#)

Process funnel

Extraneous info and links are removed to focus customers

half.com by ebay

NEW: Counting Crows: *Hard Candy* \$11.88 Save 37%! my account cart help home sign out

Home Books Music DVDs/Movies Video Games Computers & Software Electronics Everything Else...

Bestsellers Greatest Hits Live CDs Box Sets CDs \$2.99 or less

Search: Music go Advanced Search

Home > Music Sell yours now!

Compare our Prices!

Half.com \$6.99

Weezer (2001)
Weezer

Our best price: **\$6.99**
List Price: \$18.97 (Save: \$11.98)

Find out more...
Full product info, Product Reviews

Actual items for sale may vary from this image.

Product Highlights

CD
May 2001

List Price: **\$18.97**
28 minutes
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Other Works

Spread the Word:
Write a Review
Favorite Friend

Like New Sorted by Price

Price	Total Price	Seller (Rating)
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\$8.00 Buy!	\$10.45 Media Mail	stargaze13 (3)
\$8.25 Buy!	\$10.70 Media Mail	dazzyliz (1205) ★
\$8.30 Buy!	\$10.75 Media Mail	naojia@hotmail.co (35)

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State

If U.S. Military, select AE, AP or AA from bottom of list for State.

ZIP code

Country USA

Save Changes

Why this completed outdated example?

Why this completed outdated example?

It's still the same today :)

Activity

5min

Go to your favorite shopping site and find the differences!

Design Equals Solutions

Design Equals Solutions

Designers often reinvent

Hard to know how things were done before

Why things were done a certain way

How to reuse solutions

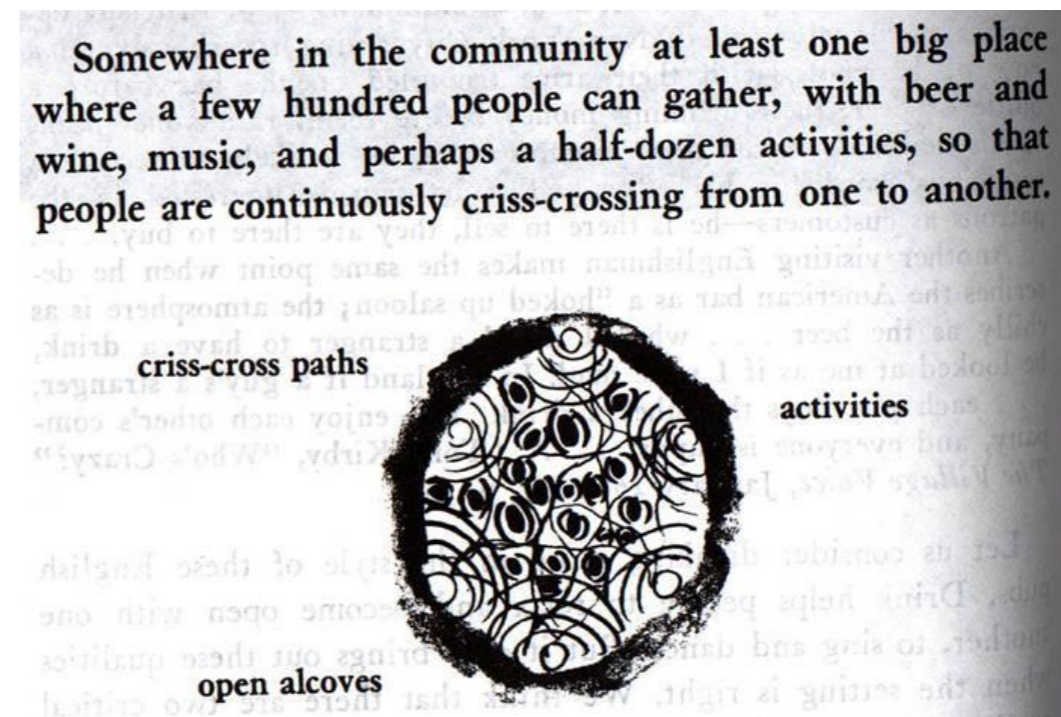
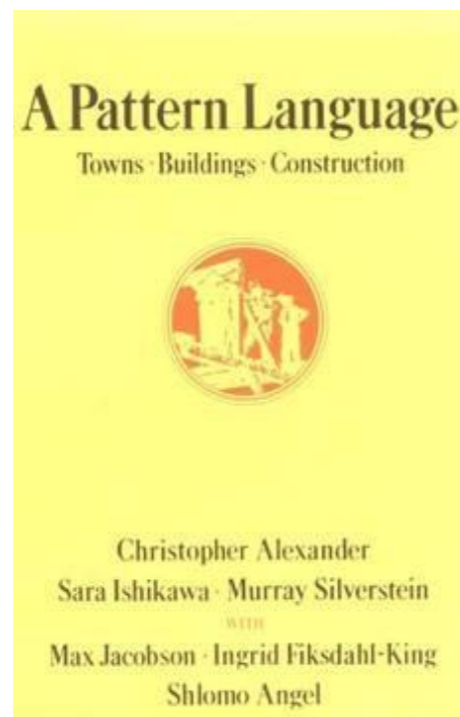
Design Patterns

Design patterns communicate common design problems and solutions

A tool for knowledge sharing

Design Patterns in Architecture

Design patterns communicate common design problems and solutions



Design Patterns in OOP and software engineering

Nice patterns for creating reusable OO software.

The Gang of Four Book!



Using Design Patterns

Not too general and not too specific

use a solution “a million times over, without ever doing it the same way twice”

Using Design Patterns

Not too general and not too specific

use a solution “a million times over, without ever doing it the same way twice”

Design patterns are a language

For sharing the key elements of a solution

Beer hall is part of a center for public life

Beer hall needs spaces for groups to be alone **ALCOVES**

Web Design Patterns

Communicate design problems & solutions

how to create navigation bars for finding relevant content

how to create a shopping cart that supports check out

how to make e-commerce sites where people return & buy



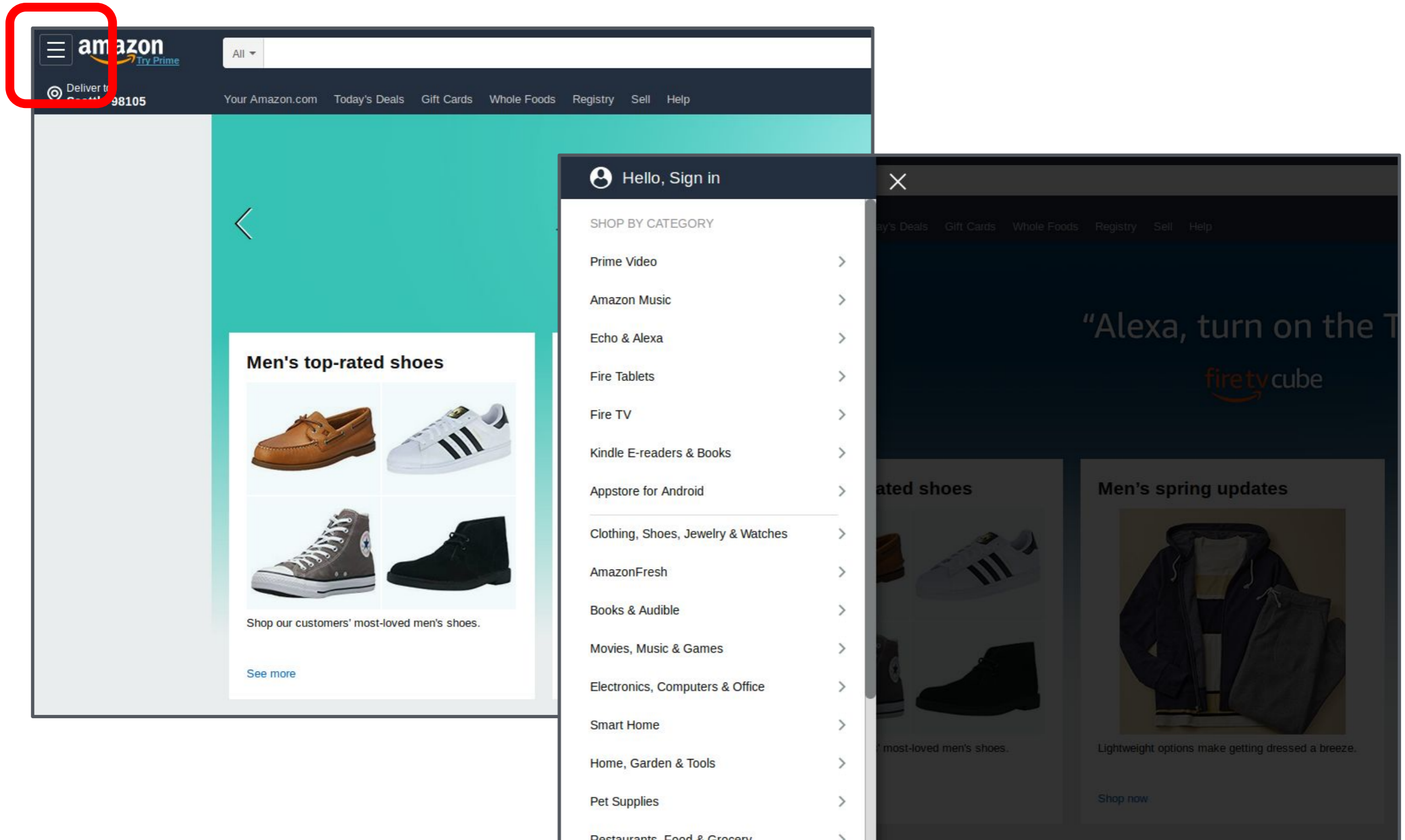
Navigation Bar (K2)

Problem: Customers need a structured, organized way of finding the most important parts of your Web site

The image shows a screenshot of a website navigation bar with several red boxes highlighting specific areas:

- Top Navigation Bar:** A dark brown bar with the text "Group for User Interface Research" on the left and "Home | Projects | People | Publications | Links" on the right. The "Projects" link is highlighted in a lighter brown color.
- Left Sidebar:** A light yellow box containing the text "DENIM and SILK" and a list of links: "Download", "Documentation", "Support", "Research", "Publications", and "More Projects".
- Main Content Area:** A blue bar with the IBM logo, "United States", and a search box. Below this is a black bar with "Home | Products & services | Support & downloads | My account".
- Country Selection:** A blue box with "Select a country" and a dropdown menu for "Industries" with a "Go" button.
- Home / home office:** A list of links: "Home / home office", "Small business", "Medium business", "Government", and "Education".
- Buy today, ship today:** A promotional banner with a laptop image and text: "Buy today, ship today" and "If you need it fast, IBM can ship select PC models to you today when you buy by 3 p.m. Eastern, Monday-Friday, (U.S. only)".
- Right Sidebar:** Three promotional boxes: "Tune-up your bottom line", "e-business on demand", and "IBM Global Financing".

Hamburger Menu



Patterns Support Creativity

Patterns come from successful examples

So successful that lots of people are familiar with their paradigms, interaction, techniques, and metaphors makes it work well across many sites (e.g., shopping carts)

Not too general and not too specific

You need to specialize to your needs

Patterns let you focus on the hard, unique problems of your design situation

Principles, Guidelines, Templates

Principles?

patterns are not that general

Guidelines?

patterns discuss trade-offs,

show good examples, and tie to other patterns

Style guides?

patterns are not too specific,

can be specialized to a design

Templates?

patterns illustrate flows and relationships among pages

Patterns help design without over-constraining

UI Pattern Form

Problem: Problems are related to the usage of the system and are relevant to the user or any other stakeholder that is interested in usability.

Use when: a situation (in terms of the tasks, the users and the context of use) giving rise to a usability problem.

Principle: a pattern is usually based on one or more ergonomic principles such as user guidance, or consistency, or error management.

Solution: a proven solution to the problem.

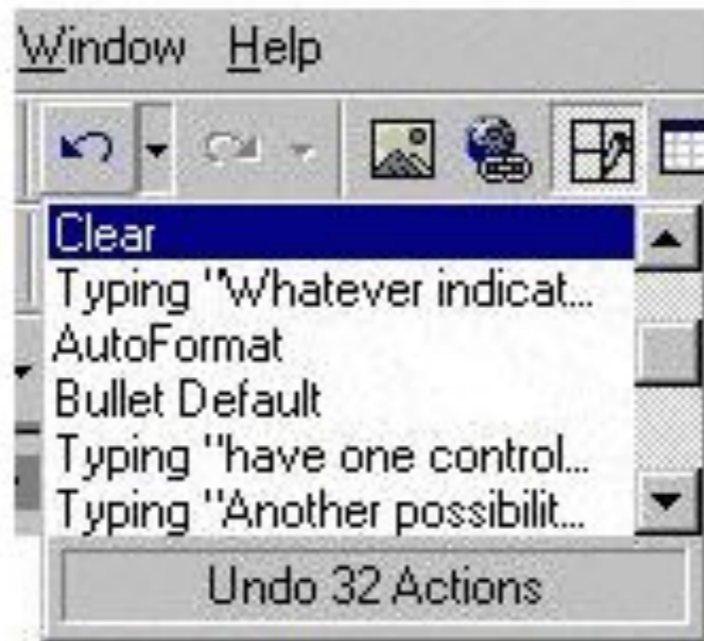
Why: How and why the pattern actually works, including an analysis of how it may affect certain attributes of usability.

Examples: Each example shows how the pattern has been successfully applied in a real life system. This is often accompanied by a screenshot and a short description.

Implementation: Some patterns provide implementation details.

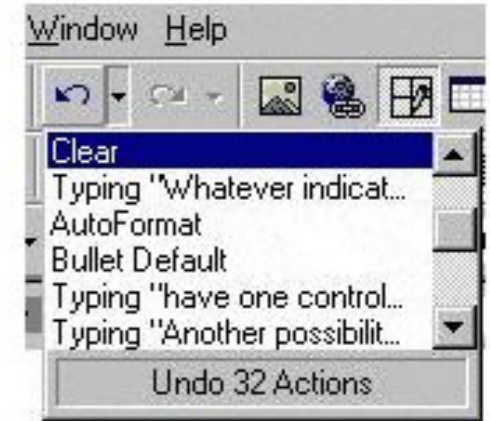
- Kruschitz, Christian, and Martin Hitz. "Human-Computer Interaction Design Patterns: Structure, Methods, and Tools." *International Journal on Advances in Software* Volume 3, Number 1 & 2, 2010 (2010).
- <https://www.interaction-design.org/literature/book/the-glossary-of-human-computer-interaction/interaction-design-patterns>

Example of a UI pattern



Undo in Microsoft Word using a visualization of the command queue

Example of a UI pattern



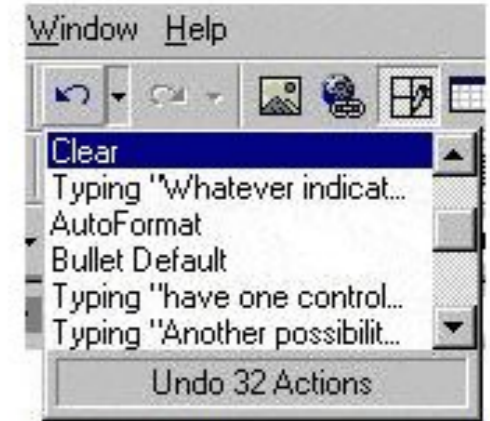
Author

Martijn van Welie <http://www.welie.com/patterns/gui/undo.html>

Problem

Users do actions they later want reverse because they realized they made a mistake or because they changed their mind.

Example of a UI pattern

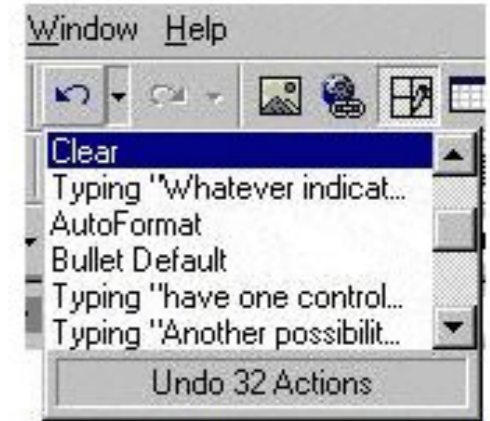


Use when

You are designing a desktop or web-based application where users can manage information or create new artifacts. Typically, such systems include editors, financial systems, graphical drawing packages, or development environments. Such systems deal mostly with their own data and produce only few non-reversible side-effects, like sending of an email within an email application. Undo is not suitable for systems where the majority of actions is not reversible, for example, workflow management systems or transaction systems in general.

Both novice and expert users may want to reverse their actions, either because of mistakes or changes in intention. Expert users may want to use the history of their actions for more specific manipulation of the data in the application. For example, in a graphical modeling application, users may want to undo work on some specific object while keeping later work done on other objects.

Example of a UI pattern

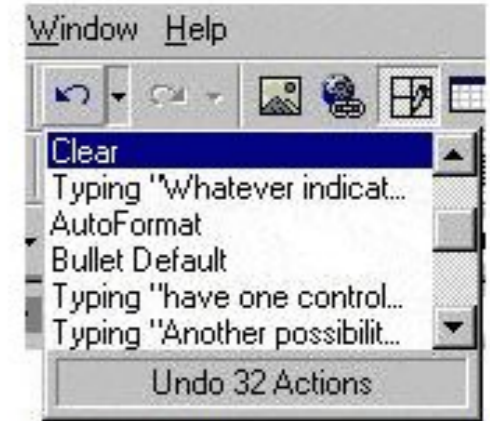


Solution

Maintain a list of user actions and allow users to reverse selected actions.

Each 'action' the user does is recorded and added to a list. This list then becomes the 'history of user actions' and users can reverse actions from the last done action to the first one recorded. This is also called a Linear Multi-level Undo.

Example of a UI pattern

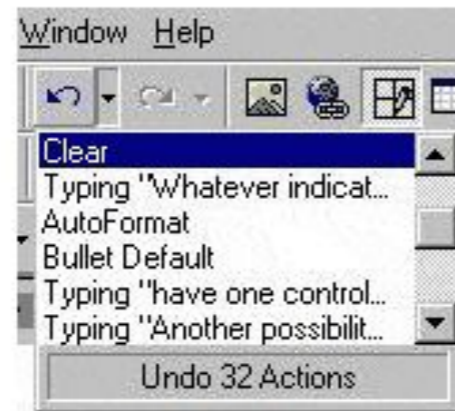


Why

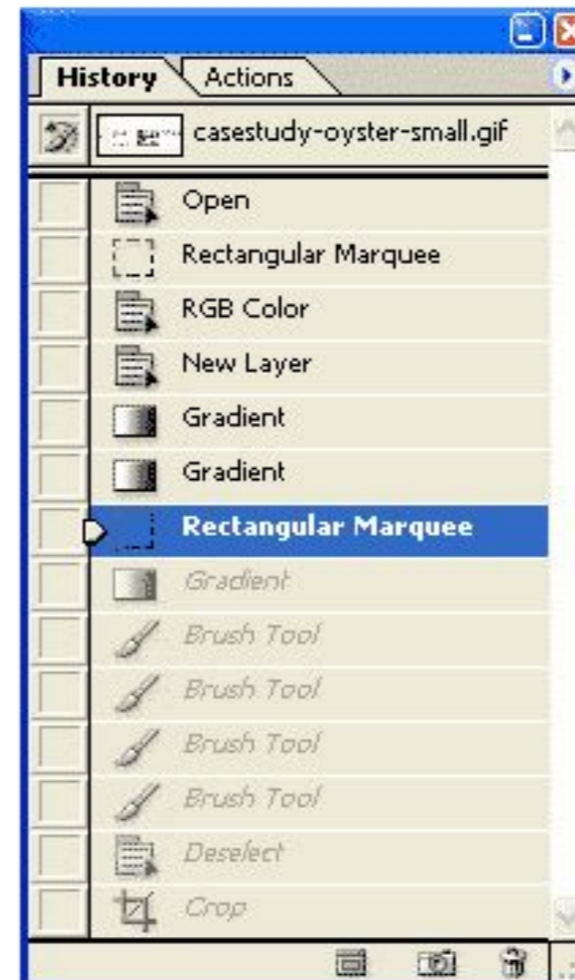
Offering the possibility to always undo actions gives users a comforting feeling. It helps the users feel that *they* are in control of the interaction rather than the other way around. They can explore, make mistakes and easily go some steps back, which facilitates learning the application's functionality. It also often eliminates the need for annoying warning messages since most actions will not be permanent

Example of a UI pattern

Examples

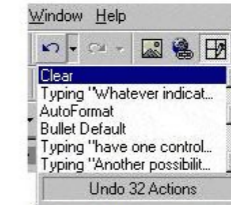


As in all MS Office applications, in Word 2000 the users can see the history of their actions and undo one or more of them. The actions are briefly described and the users can select a range of actions to be undone. After selecting undo, users can even redo the actions.



In Photoshop a selective undo is also possible. By moving the slider, users can do the normal multi-level undo but they can also drag an action into the trashcan and thereby do a selective undo. Operations that depended on that action are automatically deleted as well of they are not relevant anymore.

Example of a UI pattern



Undo in Microsoft Word using a visualization of the command queue

Implementation

Most implementations of multi-level undo are based on the [Command](#) (Gamma et al 1995) pattern. When using the Command pattern, most functionality is encapsulated in Command objects rather than in other controlling classes. The idea is to have a base class that defines a method to "do" a command, and another method to "undo" a command. Then, for each command, you derive from the command base class and fill in the code for the do and undo methods. The "do" method is expected to store any information needed to "undo" the command. For example, the command to delete an item would remember the content of the item being deleted.

More examples

Captcha

Problem

The application needs confirmation that the action that is about to happen is done by a human rather than an automated machine

Solution

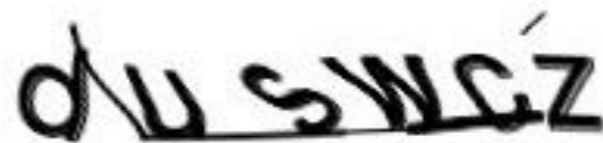
Present users with a mangled image containing numbers and letters that humans can still 'decipher' but is hard for machines to read.

Verify Your Registration

* Enter the code shown:

[More info](#) 

This helps Yahoo! prevent automated registrations.



More examples

Date Selector

Problem

Users need to select a date or a time period

Solution

Use a combination of an edit box and a graphical click able calendar

CREATE YOUR OWN TRIP

Flight only Flight + Hotel
 Hotel only Flight + Car
 Car only Flight + Hotel + Car
 Cruise Hotel + Car

Book together and save!

Departing from:

Depart:

Going to:

Adults: (age 19-64) Seniors: (65+)

More flight search options:
[Flexible dates](#), [One-way trips...](#)

Calendar: JAN 2005

S	M	T	W	T	F	S
						X
X	X	X	X	X	X	X
X	10	11	12	13	14	16
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

From www.expedia.com

Pre-patterns

Patterns require broad adoption and examples

Many version of the same basic idea

Shown successful in many contexts

That is what makes them patterns

This is challenging in novel domains

Pre-patterns are based in weaker evidence

Can help speed diffusion of techniques and results

Can help see relationships among ideas

Dark Patterns

A design that has been carefully crafted to trick people into doing things, such as buying insurance with their purchase or signing up for recurring bills.

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Example: Disguised Ads

Ads that are disguised as other kinds of content or navigation, in order to get users to click on them

Dark Patterns

A design that has been carefully crafted to trick people into doing things, such as buying insurance with their purchase or signing up for recurring bills.

Example: Disguised Ads

Ads that are disguised as other kinds of content or navigation, in order to get users to click on them

Example: Friend Spam

A site or game asks for your credentials, then goes on to publish content or send out bulk messages

Dark Patterns

EVIDENCE

After Lawsuit Settlement, LinkedIn's Dishonest Design Is Now A \$13 Million Problem

HOPEFULLY, THIS WILL BE A LESSON TO OTHER COMPANIES WHO USE DARK UX PATTERNS TO TRICK THEIR USERS.

10 5 100 850 1.2K 1.5K
NOTES PHOTOS SLIDES SHARES TWEETS LINKS

Anyone who has ever signed up, or even known anyone who has signed up, for LinkedIn has probably found themselves on the receiving end of dozens of follow-up emails, inviting you to "expand your professional network." Even worse, they're virtually impossible to opt-out of. It's a scummy use of dark UX patterns by a company that should know better. Now, LinkedIn is going to be paying for it as part of a class-action lawsuit, to the tune of \$13 million.



Photo: Maxime Le (@maxle)

Presented in San Jose's U.S. District Court, the key issue in *Avintiv v. LinkedIn* is spam. Namely, during the user sign-up process, LinkedIn claims that it "will not store your password or email anyone without your permission." Despite this, LinkedIn sends automated follow-up email reminders on a new user's behalf to any contacts harvested from their webmail accounts, which are presented in such a way as to appear as if they came directly from the user.

Under California law, the sitting judge says has deemed this illegal. Consequently, if you were a member of LinkedIn's "add connection" program between September 2011 and October 2014, you can submit a [claim](#) to get a payout.

EVIDENCE

WHAT THE SCIENCE HAS TO SAY ABOUT DESIGN, CREATIVITY, INNOVATION, AND VISUAL CULTURE.

READ MORE

TRENDING

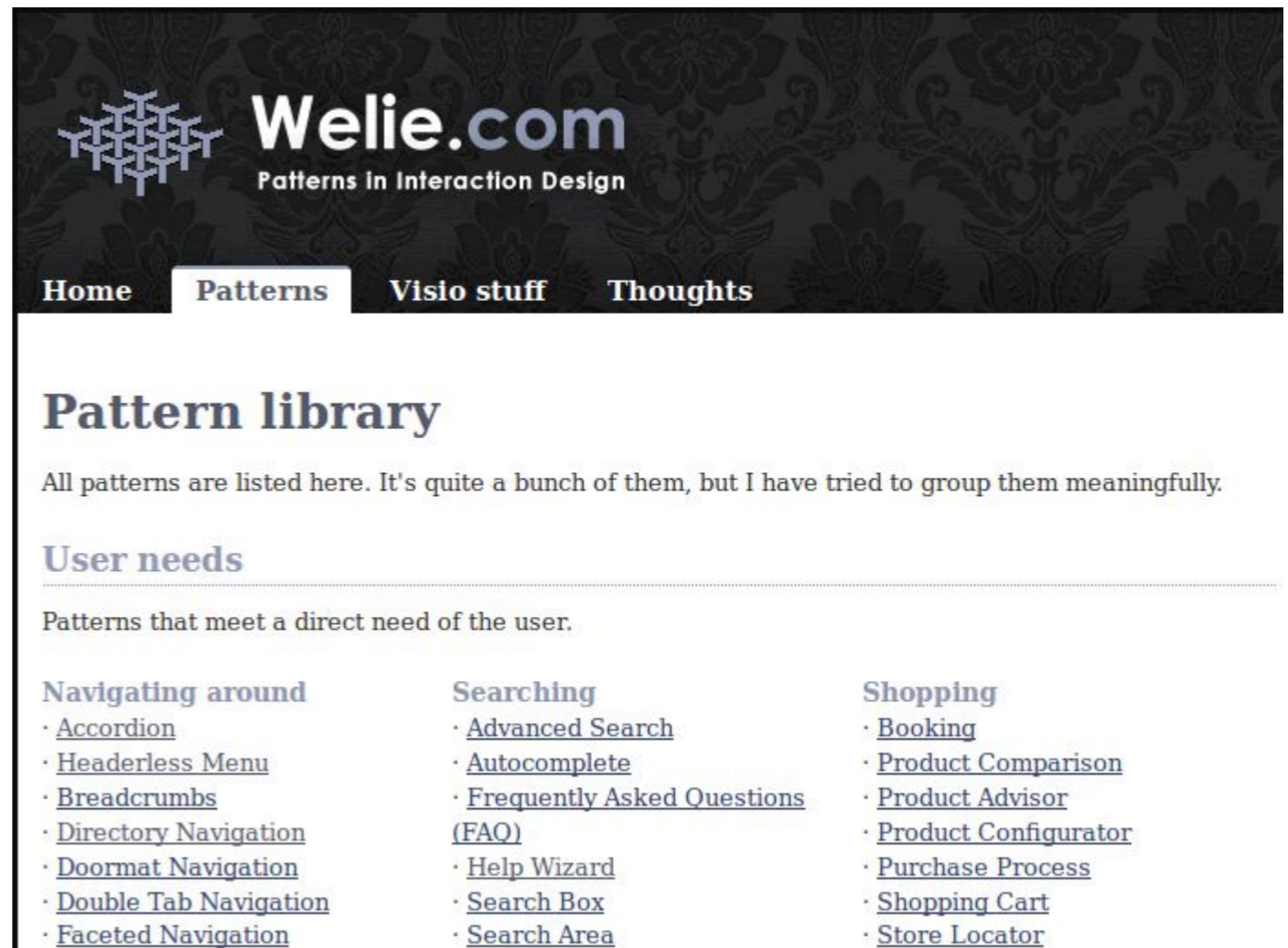
HAPPENING NOW

- 1 Google Goes Analog With Its New Note-Taking Tools
- 2 Will Flat Design Ever Die?
- 3 This Note-Taking System Turns You Into An Efficiency Expert
- 4 5 Radical Ideas To Totally Disrupt Air Travel
- 5 UI, UX: Who Does What? A Designer's Guide To The Tech Industry

Pattern exercise

In preparation for the exam:

Read and answer [the handout](#).



The screenshot shows the Welie.com website. The header features a logo of a tree-like structure and the text "Welie.com Patterns in Interaction Design". A navigation bar includes "Home", "Patterns", "Visio stuff", and "Thoughts". The main content area is titled "Pattern library" and contains a paragraph: "All patterns are listed here. It's quite a bunch of them, but I have tried to group them meaningfully." Below this is a section titled "User needs" with a dotted line separator. Under "User needs", it states "Patterns that meet a direct need of the user." and lists three categories: "Navigating around", "Searching", and "Shopping". Each category has a list of sub-patterns.

Welie.com
Patterns in Interaction Design

Home Patterns Visio stuff Thoughts

Pattern library

All patterns are listed here. It's quite a bunch of them, but I have tried to group them meaningfully.

User needs

Patterns that meet a direct need of the user.

Navigating around <ul style="list-style-type: none">· Accordion· Headerless Menu· Breadcrumbs· Directory Navigation· Doormat Navigation· Double Tab Navigation· Faceted Navigation	Searching <ul style="list-style-type: none">· Advanced Search· Autocomplete· Frequently Asked Questions (FAQ)· Help Wizard· Search Box· Search Area	Shopping <ul style="list-style-type: none">· Booking· Product Comparison· Product Advisor· Product Configurator· Purchase Process· Shopping Cart· Store Locator
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Ask me something!